

MASS MEMORIES OF INTEREST

NEW WORLD COMPUTER COMPANY INC.

3176 PULLMAN STREET, SUITE 119, COSTA MESA, CALIFORNIA 92626 (714) 556-9320

Aug 79

July 24, 1979

Ted Nelson, Pres.
Computopia
Box 128
Swarthmore, PA 19081



Dear Ted Nelson:

Thank you for taking the time to visit our display at the recent National Computer Conference in New York City. Enclosed is the additional information that I promised at that time to send you.

The **MIKRO-DISC™ 211** is now in production with limited quantities scheduled for deliveries starting in the fourth quarter of 1979. These are being allocated now for evaluation by O.E.M. customers that have immediate needs and volume requirements. Pilot production from soft tooling is scheduled at a rate of 100 per month in January, to be followed by full capacity from hard tooling in June of next year. Orders will be accepted for quantities of 100 units annually at \$1250.00 each and for quantities of 1,000 or more units annually at \$900.00 each. Evaluation units are priced at \$4,500.00 each which will be credited against volume releases. All prices are quoted f.o.b. our facility in Costa Mesa, California and orders are subject to New World Computer Company standard terms.

For the immediate future, all sales will be conducted directly from the factory in Costa Mesa, California. We plan to implement regional representation to support O.E.M. accounts during 1980, followed by direct product distribution world-wide shortly thereafter.

Due to the extremely large attendance of the show and the volume of visitors to our exhibit, we were unable to dedicate the time necessary to thoroughly familiarize ourselves with your requirement, nor was it possible to answer all of the questions that you undoubtedly had and provide the precise information that you desire. If you would assist us by taking just a few minutes to complete the enclosed form, we will better understand how we may be of service to you and to your organization in the near future.

Thank you for your interest in New World Computer Company, Inc. and in its products. We look forward to working closely with you and to providing you with the memory systems products that you require. Should you desire more detailed information, please do not hesitate to call us at any time. If you are planning to visit the Orange County area sometime in the future, we extend an open invitation to visit with us at our facilities.

Very truly yours,

NEW WORLD COMPUTER COMPANY, INC.

Philip C. Haines
Philip C. Haines
President

PCH:sd
enclosures

PRODUCT AND MARKET PLANNING INFORMATION

1. Please indicate which classification best describes your need for the MIKRO-DISCTM 211:

☐ O.E.M. Customer
☐ Marketing Organization:
 ☐ International Distributor ☐ Domestic Distributor
 ☐ Domestic Retail ☐ Domestic Mfr's Rep
☐ Press
☐ Financial Advisors ☐ Investors ☐ Brokers/Underwriters
☐ Consultants
 ☐ Hardware ☐ Software ☐ Systems
 ☐ To End-Users ☐ To Manufacturers
☐ End-User
☐ Competitor
☐ Vendor

2. Is there application for the MIKRO-DISCTM 211 in your ☐ existing or in your ☐ planned products?
3. Estimated annual need is units.
4. Please indicate the nature of your planned application of the MIKRO-DISCTM 211:

Nature of your system's application:

☐ Business Machine ☐ Word Processing ☐ Manufacturing
☐ Scientific ☐ Engineering ☐ Industrial

Nature of your customer's (or your own) end-user application:

☐ Accounting ☐ Data Base Management ☐ Word Processing
☐ Graphics ☐ Data Acquisition ☐ Control System
☐ ATE ☐ Data Analysis & Reduction
☐ Communications ☐ Report Formatting & Generation

System Configuration:

☐ Free-Standing ☐ Time-Shared ☐ Terminal
☐ Distributed Data Processing

System Size:

☐ Large Data Base System ☐ Medium Data Base System
☐ Small Data Base System

Nature of the disc drive application:

☐ Swapping Disc ☐ Cache Memory ☐ Main Memory (virtual)
☐ Program Store ☐ File Store ☐ Program & File Store
☐ Data Collection ☐ Data Communications

Please use the reverse side of this page for any comments that you may wish to make.

PRODUCT AND MARKET PLANNING INFORMATION

5. Please indicate your present and planned disc memory use:

	CURRENT DISK MEMORY USE			PLANNED DISK MEMORY USE		
	Capacity	Price	Annual Quantity	Capacity	Price	Annual Quantity
Diskette Drives	_____	_____	_____	_____	_____	_____
Cartridge Drives	_____	_____	_____	_____	_____	_____
Pack Drives	_____	_____	_____	_____	_____	_____
Fixed Disk Drives	_____	_____	_____	_____	_____	_____
Head/Track Drives	_____	_____	_____	_____	_____	_____

6. Do you plan to use 8-inch fixed media disk drives? ☐ YES ☐ NO

Probable Vendor _____ Evaluation Units Needed: _____

Interface desired: ☐ Vendor minimum ☐ SMD ☐ Cartridge ☐ Other

If other than vendor minimum, please specify compatibility: _____

Controller: ☐ will build own ☐ Multibus ☐ IEEE 488 ☐ S-100
☐ 6800/68000 ☐ Z-Bus ☐ LSI-11
☐ Other, please specify: _____

7. ☐ My need is urgent, please call as soon as possible

☐ Evaluation units needed by: ____/____/____

☐ Production scheduled for: ____/____/____

☐ Our need is not immediate, but keep my name on your mailing list.

Name: Ted Nelson

Title: Pres.

Company: Computopia

Street: Box 128

City: Swarthmore State: PA Zip: 19081

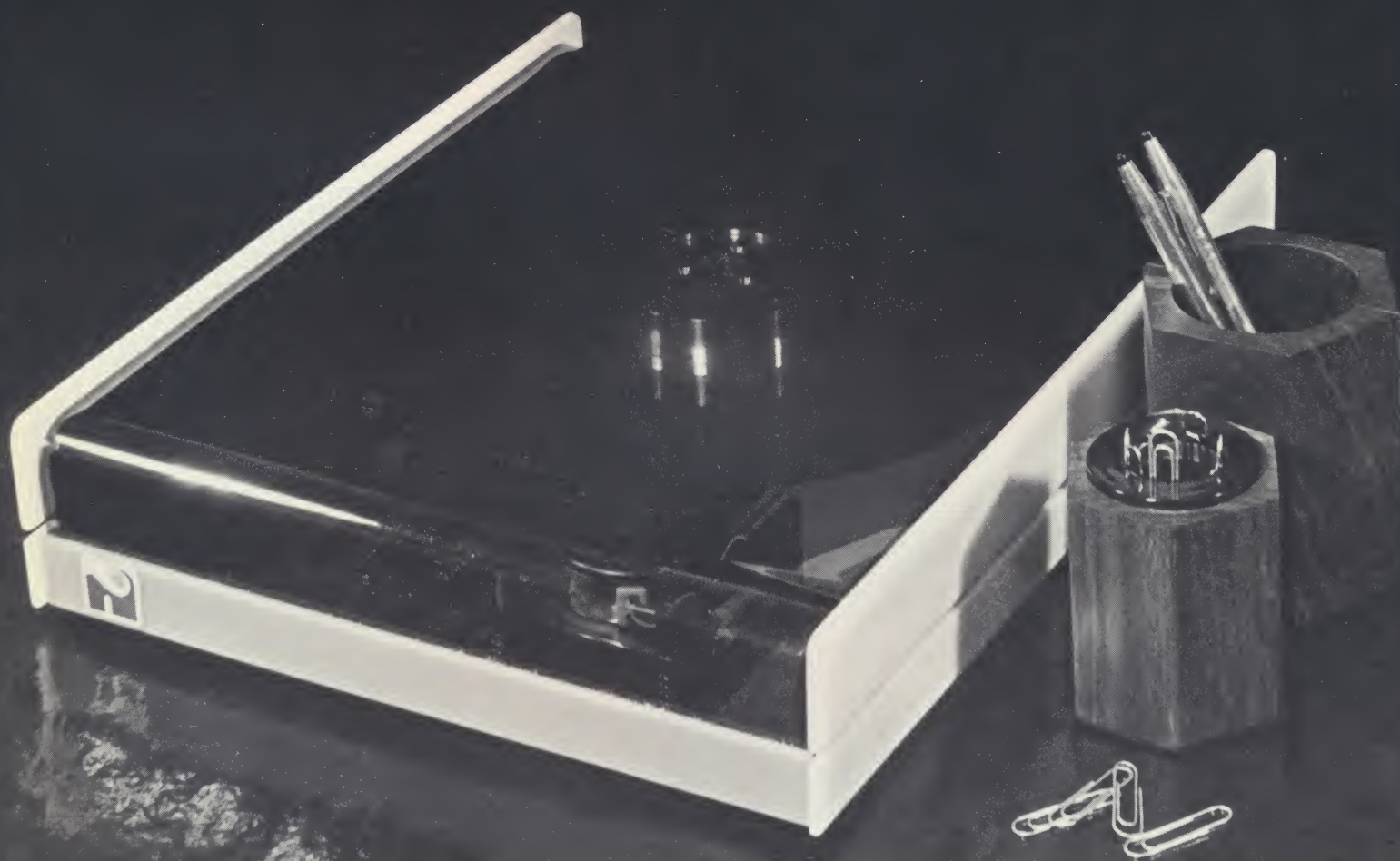
Telephone Number: (____) ____-_____

Please fold and staple this self mailing questionnaire and return to us as soon as possible. Your input is extremely valuable to our planning effort. Thank you.



NEW WORLD
COMPUTER COMPANY INC.

INTRODUCES
THE
BUBBLE BURSTER™...
MIKRO-DISC™ 211



THE AVAILABLE — LOW COST — CACHE MEMORY SYSTEM

MIKRO-DISC™ 211 PRODUCT DESCRIPTION

The First Major Advance In Disc Drive Technology In a Decade

The NEW WORLD COMPUTER COMPANY, INC. MIKRO-DISC™ 211 is a low-cost, quick access disk drive based upon a Modified Winchester technology. The micro-sized (210 cubic inch) drive features an 8 inch diameter hard disk and a proprietary low-mass multiple head assembly that provides ultra fast access to data. The MIKRO-DISC™ 211 is a departure from conventional "mini-disks". It's data access characteristics make it ideally suited for systems that require high speed cache and mass store capability not available from present suppliers. It is a powerful, low cost memory system that fills a gap that exists between conventional drives and central memory.

A Versatile Memory System

The NEW WORLD MIKRO-DISC™ 211 efficiently augments or replaces floppy disks, supplements other mass store devices by acting as high speed cache to provide fast access to data, improve system response time by providing fast access key directory storage, and act as the primary file device in small systems.

Unequaled Performance

NEW WORLD COMPUTER COMPANY, INC. has developed a superior drive that attacks the cost/performance parameter as well. The MIKRO-DISC™ 211 provides 20 read/write heads, 160 tracks per surface, and places over a quarter of a million bytes (one cylinder) immediately beneath the heads and accessible within one disc rotation. Average access time to the entire capacity of the drive is only 18.825 milliseconds.

MIKRO-DISC™ 211 APPLICATIONS

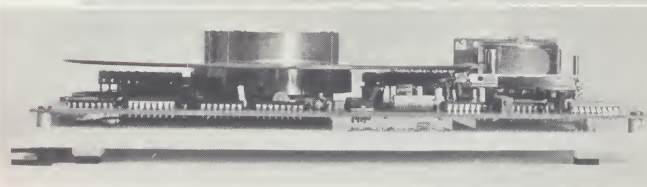
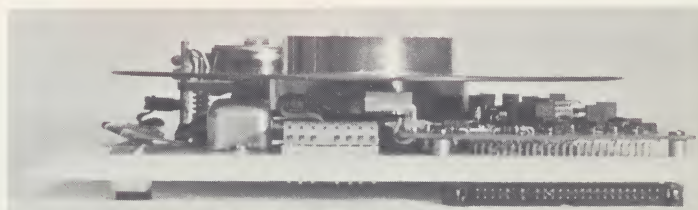
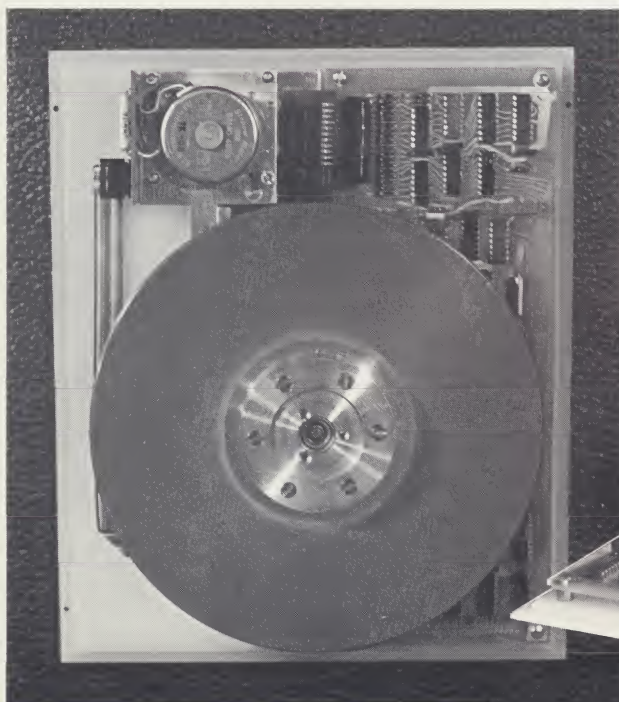
Whether the system is ultimately intended for business, scientific, engineering, manufacturing or industrial users, the characteristics of this drive enhance its versatile use as a cache memory or swapping disk in data-base systems of all sizes; as the primary file store device in small or dedicated systems; and as a quick access, high throughput storage system in on-line systems.

Cache Memory

Economical, fast access mass storage can fill a broad gap that now exists between core or semiconductor random access memories and existing file store devices. The MIKRO-DISC™ 211, the Quick-Access Disk Drive can be interfaced directly to the mass store controller and allow a substantial increase in the number of users accessing the data-base in reasonable response time.

File Store

Dedicated Applications Systems, Small Scientific Computers, Business Machines for Word Processing and Accounting Applications, and many personal computers require data-bases on the order of a few hundred thousand bytes to a few megabytes. A single floppy drive could be added to a MIKRO-DISC™ 211 with only a nominal increase in cost. This would place a 2.1 Megabyte fast access capacity on-line in addition to the capacity of the floppy, reduce average access time, and retain file copies and secure back-up files. The MIKRO-DISC™ 211 permits an increase in the number of users accessing the system and its data-base. Transfer rate can be synchronized to the screen to provide refresh functions, scratch-pad, and fast access storage of working data and programs.



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MIKRO-DISC™ 211 FEATURES

18.825 msec. Average Access Time
2.1 Megabyte Capacity
6.052 Mbit/sec Transfer Rate
9.5 In. x 11 In. x 2.0 In.

8.825 msec. t_a To .250 MByte
20 Read Write Heads
Less Than 50 Watts Power
Less Than 210 Cubic Inches

Less Than \$1,000.00 in Large O.E.M. Quantities

The outstanding features of this exciting new drive are the extremely low-mass, multiple head assembly that permits the high recording densities achieved by a 20 micro-inch flying altitude and the simplified actuator mechanism that facilitates 5 millisecond track to track positioning time. In fact, it is the utter simplicity of the head and actuator assembly that makes it economically feasible to provide 20 Read/Write heads per surface, and enable an exceptional 8.825 millisecond average access time to a Quarter of a Megabyte at such a low price!

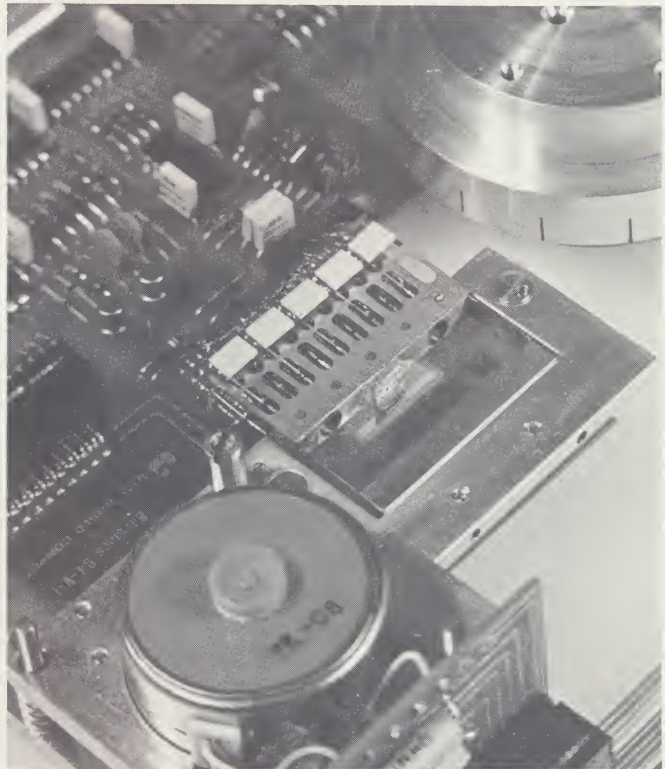
The disk itself is lubricated oxide, Winchester-Type technology, having an outside diameter of 8-inches and an inside diameter of 2.5-inches. The recording area is 1.6-inches wide, and the current model provides 160 tracks, each 8-mils wide recorded on 10-mil centers. This conservative specification assures high data reliability and is well within the current state of the producible art. Inside track diameter of 4.25-inches provides for an unformatted capacity of 13,351 bytes per track (106,814 bits).

Data integrity experience has been exceptional on the existing prototypes under laboratory evaluation. Soft error rates are less than 1 in 10^{10} bits, and hard error rates less than 1 in 10^{12} bits. Positioning errors are less than 1 in 10^6 accesses. Design goals for the MIKRO-DISC™ 211 are to offer a Mean Time Between Failure of greater than 5,000 hours, and a Mean Time To Repair of less than 30 minutes.

Dissipating less than 50 watts total, the power requirements are quite conservative. The MIKRO-DISC™ 211 uses only 110 VAC at 150mA (Max) and DC voltages of +24VDC at 1.0A (Max) and -5VDC at 75mA (Max).

Environmental considerations are also quite un-restrictive, since the MIKRO-DISC™ 211 will perform to specification over a wide temperature and humidity range. It is hermetically sealed and features a built in self contained filtering system. The operating altitude may vary from sea level to 10,000 feet.

TWENTY ELMOS™ HEADS Fly at 20 micro-inches to record data in an MFM format at 8000 bpi density. Since the MIKRO-DISC™ 211 provides 160 tracks per surface, each of the 20 heads services 8 tracks. In addition, the advantage of using twenty Read/Write heads assures that 0.250 Megabytes (one cylinder) is always immediately available for access without repositioning the head assembly!



The unformatted capacity of the MIKRO-DISC™ 211 is 2.1 Megabytes (17 Megabits) on a single surface. Formatted into 24 Sectors per track of 512 Bytes each, the capacity of the drive is 1.966 Megabytes (15.7 Megabits). Cylinder capacity is therefore 267,020 Bytes unformatted and 245,765 Bytes formatted; and Track capacity is 13,351 Bytes unformatted and 12,288 Bytes formatted.

The disk rotates at 3400 RPM, providing a data transfer rate of 756K bytes per second (6 Mbits/second). Average rotational delay is 17.65 milliseconds and latency is 8.825 milliseconds.

The MIKRO-DISC™ 211 is available in either an attractive designer series desk top enclosure or in a rack-mount package. Extremely rugged and light weight in design, the MIKRO-DISC™ 211 is half the size of an 8 inch floppy disk drive. It will perform in any attitude: vertical and horizontal, upright or inverted, which enables convenient use in any system configuration.

The MIKRO-DISC™ 211 will be priced at less than \$1,000.00 in large O.E.M. quantities.

The interface provided in the NEW WORLD MIKRO-DISC™ 211 is a daisy-chained cable interface.

MIKRO-DISC™ 211 SPECIFICATIONS

STORAGE CAPACITY

Unformatted Capacity	2.1 Megabytes
Per Disk Surface	17,090,264 bits 2,136,283 Bytes
Per Cylinder	2,136 160 bits 267,020 Bytes
Per Track	106,814 bits 13,351 Bytes
Formatted Capacity	1.9 Megabytes
Format	24 Sectors per track 512 Bytes per sector
Per Disk Surface	15,728,640 bits 1,966,080 Bytes
Per Cylinder	1,966,080 bits 245,760 Bytes
Per Track	98,304 bits

RECORDING MEDIUM

Technology	Modified Winchester
Dimensions	8-inch Outside Diameter 2.5-inch Inside Diameter
Coating	Lubricated Oxide

READ/WRITE HEADS

Technology	ELMOSTM
Flying Altitude	20u-inches
Number of Read/Write Heads	20 per surface
Average Latency	8.825 msec

READ/WRITE SPECIFICATIONS

Recording Density	8000 bpi
Data Transfer Rate	6,052,000 bits per second 756,500 Bytes per second
Average Latency	8.825 msec

MECHANICAL SPECIFICATIONS

Number of Recording Tracks	160
Number of Cylinders	8
Tracks Per Cylinder	20
Head Positioning Time	5 msec
Inside Track Diameter	4.25 inches
Disk Rotation Speed	3400 RPM
Disk Rotational Delay	17.65 msec
Motor Start Time	1 minute

DATA RELIABILITY

Read Error Rate:	Less than 1 in 10 ¹⁰ bits
Soft Errors:	Less than 1 in 10 ¹² bits
Hard Errors:	
Read Error Rate:	Less than 1 in 10 ¹⁰ bits
Soft Errors:	Less than 1 in 10 ¹² bits
Hard Errors:	
Positioning Errors:	Less than 1 in 10 ⁶ accesses

POWER REQUIREMENTS

Less than 50 Watts
110VAC @ 150mA
+24 VDC @ 1.0A (Max)
-5 VDC @ 75mA (Max)

PHYSICAL DIMENSIONS

Width	9.5 inches
Height	2.0 inches
Depth	11 inches
Weight	Less than 8 pounds

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	41°F to 113°F (5°C to 45°C)
Operating Humidity	20% to 80% non-condensing
Operating Altitude	Sea Level to 10,000 feet
Storage Temperature	-17°F to 150°F (-30°C to 60°C)
Storage Humidity	0% to 80% non-condensing

INTERFACE SPECIFICATION

INPUT/OUTPUT LINES

Standard	
Data Line	Shielded Twisted Pair, MFM Data Input/Output
Optional	
Data Line	Shielded Twisted Pair, NRZ Data Input/Output

INPUT LINES

Standard	
Read/Write Mode Control	1 Line, Read/Write Level Select
Head Address Lines	5 Lines, 5-bit parallel track address
Unit Select	1 Line, Unit select line allows communication with the selected drive
Optional	
Head Step Direction	6 Lines, 6-bit parallel track address
Head Step Pulse	1 Line, Head Direction Level Select
	1 Line, 2usec Duration, 5msec period

OUTPUT LINES

Standard	
Sector and Index Line	1 Line, Sector pulses are 2usec duration @ 1.17 msec period. Index pulse appears as an extra 2usec pulse 585 usec preceding sector '0' pulse
Optional	
Optional Track 00 Lines	1 Line Indicates head is located at Track '00' position



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